DOCUMENT RESUME

ED 056 144 UD 011 875

AUTHOR Burch, William R., Jr.
TITLE The Peregrine Falcon and the Urban Poor. Some Sociological Interrelations.
PUB DATE Aug 71
NOTE 22p.; Revised version of paper presented at American Sociological Association annual meeting, Denver, Colo., August 1971

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS *Air Pollution Control; *Disadvantaged Groups; Economic Disadvantagement; *Pollution; Social Class; *Urban Environment; Urban Population

ABSTRACT

It is shown what the peregrine falcon, threatened with extinction by DDT, and the urban poor have in common. Specifically, a study in New Haven, Connecticut was done to explore the relation between social class and the average emissions for the air pollutants: carbon monoxide, hydrocarbons, nitrogen oxides, sulfur oxides, and particulate matter. (Data are taken from a New Haven Health Department study in 1968.) Lower class urban dwellers are more often exposed to air pollution; and that each of the particular pollutants, when ingested at certain modest levels over continuing periods, is likely to be an important influence upon one's ability to persist in the struggle for improvement of social position. The upper class urban or suburban commuter, although he faces peaks of high pollution exposure, his body has much longer troughs of lower exposure levels and some ability to discharge the irritants. However, the urban poor face unremitting exposures, which like nutritional deficiencies, seem one mechanism by which class differences are maintained. This is true not only for air pollution but also for noise and other assaults upon the senses. (Author/JW)

ED056144

The Peregrine Falcon and the Urban Poor
Some Sociological Interrelations*

William R. Burch, Jr.
Yale University

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

*Revised version of paper presented at American Sociological Association meetings in Denver, August 1971. The author is indebted to Merlin Shelstad for his computational and analytic assistance.

UD 011875

The Peregrine Falcon and the Urban Poor -
Some Sociological Interrelations

The Problem

The standard definition of poverty is a lack of material riches or goods. In other words, the only thing that separates the poor from the rich is money. It is an economic problem. In the wisdom of the academic division of labor such problems should be of no concern to sociologists. Still, whether it is maximum feasible misunderstanding or simply the episodic flow of anti-poverty funds - a substantial aggregate of sociologists have developed a stake in the belief that poverty is more than a matter of money.

The duck hawk, or the American variety of the peregrine falcon, has occupied an important niche within the ecology of our spreading continent. Due to high concentrates of D.D.T. in its life system, it is a declining and potentially extinct species. The falcon is an ecological problem. In the wisdom of the academic division of labor, the plight of the falcon should be of no concern to sociologists. To my knowledge no sociologist has given attention to this biotic underclass of our society. Apparently there are some things we consider to be none of our business.

Mr. Etzioni, the distinguished chairman of the Department of Sociology at Columbia University seems to sum up our interest in such matters. He recently argued that "fads" such as ecology or opinion polls which show high rates of public concern about pollution are a lot of rubbish. He is certain that, "Even if a presently threatened species - say, Louisiana's

brown pelicans -- were to disappear, it is still ridiculous to expect that the whole ecology would be so thrown out of equilibrium that our economy or society would collapse." A few sentences later he comes out four-square for the welfare of our species over all others. "Now we should continue to give top priority to 'unfashionable' human problems. Fighting hunger, malnutrition, and rats should be given priority over saving wildlife, and improving our schools over constructing waste disposal systems."[1]

The liberal good intentions from Morningside Heights are at the core of conventional sociological wisdom. Still, sociologists with all their homeocentric intentions may be sitting on the same limb they are sawing off. If animals high on the food chain are becoming extinct -- not in the slow cumulating Darwinian pattern, but in the dramatic, high speed Madison Avenue pattern -- then what becomes of that species which is so dependently at the top of all the food chains?

I would argue that the plight of our urban poor and the peregrine falcon have more in common with one another than either has with the good intentions of liberal professors. The falcon and the poor are both victims of the market matrix which converts all into pecuniary value. They are the residue of what Schumpeter calls the essential fact of capitalism -- "creative destruction."[2] And like the Mayor of Newark said of his city -- their respective fates may foretell the fate of us all. Further, both the poor and the falcon are components of ubiquitous hierarchical systems: The falcon is at the top of his food chain -- the poor are at the bottom of a food, materials, and energy chain. And when we get into matters

of hierarchy we are into a central issue of sociology.

As Melvin Kohn noted in a recent and impressive study:

> "Remarkable though it seems, one aspect of social structure, hierarchical position, is related to almost everything about men's lives -- their political party preferences, their sexual behavior, their church membership, even their rates of ill health and death. Moreover, the correlations are not trivial; class is substantially related to all these phenomena."[3]

In our times it may be inappropriate to ask why the poor always seem to be with us, or to ask about the mechanisms which maintain the regularities observed in class associations. Still it seems essential to ask why differential access to scarce social resources -- wealth, prestige, power, information -- seems to be a condition of existence in all societal systems and particularly those systems larger than tribal organization. Indeed, the persistence of impoverished classes in the many existing varieties of communism, socialism and capitalism suggest that poverty involves something more than economic institutions.

Kohn examines the way in which parental values transmitted to the next generation tend to perpetuate class inequalities. His is a persuasive treatment of a classical argument. I would simply hope to complement his discussion by exploring the ways in which a biological component may also serve to reinforce and perpetuate particular hierarchical systems.

Cravioto and others have illustrated how the social conditions of malnutrition have had the effect of keeping the underclass in their place. As Cravioto notes there are several ways in which malnutrition has such consequences: (1) "during periods of malnutrition the child is less responsive to his environment and consequently learns less;" (2) there is severe interference during critical periods of learning which may never be overcome; (3) there is apathy and reduced interaction at a critical period, and finally (4) "nutritional inadequacy may interfere with the staging and timing of the development of both brain and behavior."[4]

Eichenwald and Fry state the issue more bluntly: "In pre-industrial societies, the socially and politically dominant classes can utilize malnutrition as a means of maintaining their control over vast numbers of economically deprived groups. If chronic malnutrition leads to decreased mental function and apathy, it represents a powerful tool of the oppressor over the oppressed. Thus, it would be to the advantage of the ruling group to maintain the majority of the population under conditions favoring widespread malnutrition."[5] It would seem that socially induced physiological conditions, from narcotics addiction in Harlem to malnutrition in Appalachia may play a role in maintaining particular hierarchical forms.

I have wondered if Mr. Etizoni's alleged middle-class fad -- pollution -- might play a similar function. Air pollution and noise pollution seem convenient points for exploring the relation between pollution levels and class levels. Data on air pollution and social class in New Haven, Connecticut

provide one set of observations. New Haven is a middlesized, industrial city burdened with an Ivy University at its center and sharing most of the other problems characteristic of such cities. It gained some notoriety for being the first model city to be burned. For noise polution I could not resist the contrast between the "jet-setters" of Kennedy International Airport sailing into their full-page sunsets and the several hundred thousand urban poor firmly rooted in their public housing projects under jet noise contours far above permissible maximums. Though these data are far from conclusive, the trends in the associations are such as to suggest the need for including a broader range of biological variables in sociological explanations.

A useful illustration of this importance is Lave and Seskin's study of the relation between socioeconomic status, death rates and air-pollution in 114 SMSA's of the U.S. Using an impressive array of statistical techniques, they found that "As the (bi-weekly) minimum level of suspended particulates increases, the death rate rises significantly. Moreover, the death rate increases with (1) the density of population of the area (2) the proportion of non-whites, (3) the proportion of people over age 65, and (4) the proportion of poor families. Eighty percent of the variation in the death rates across these 114 statistical areas is explained by the regression." They note further,". . . it is the minimum level of air pollution that is important, not the occasional peaks. People dealing with this problem should worry about abating air pollution at all times, instead of confining their concern to increased pollution during inversions."[6]

Our New Haven study provided a more detailed examination of the relation between social class level and the average emissions for the following pollutants: Carbon monoxide, hydrocarbons, nitrogen oxides, sulfur oxides, and particulate matter. Data are from an air pollution study done by the New Haven Health Department in 1968.[7]

Method

These data are in the form of one-mile square grids with the pollution level for each square given in pounds of average emissions per day for each pollutant. The grid data were converted into maps showing pollution levels by means of contour lines. Except in the case of particulate matter emissions, these maps show that the distributions of pollutants are concentric, with the high concentrations in the center and the level dropping steadily as the distance from the center increases. For carbon monoxide and hydrocarbons, the center of concentration is the central business district. These distributions are somewhat "starshaped" with the "points" extending along the radiating super-highways. For nitrogen oxides, the center is about a mile northwest of the business district in the vicinity of an industrial area. Sulfur oxide concentrations are strongest in the vicinity of the power plant and not as widely spread as CO, nitrogen oxides, and hydrocarbons. The distribution pattern for particulate matter is unique, characterized by two centers of concentration (the power plant and an area about a mile northeast near the railroad yards), giving the distribution a "figure-eight" shape.

In our analysis the distributions of CO, nitrogen oxides, and hydrocarbons have been treated separately from those for sulfur oxides and particulate matter since the latter are not widely spread but occur in specific locations. These latter pollutants are at their highest levels in the Fair Haven district where all but one of the Block Groups are classified as lower-middle or lower socio-economic status . Family incomes in Fair Haven are lower than the city average. The average valuation of single family houses is one of the lowest for the city's neighborhoods. Although Fair Haven is, by no means, the greatest concentration of poverty in the city, it consistently appears below the median in such indicators of social class as income, education and occupation.

For the other three pollutants, the distribution was divided into six equal levels and represented by contour lines on the map.

Level	Carbon Monoxide	Nitrogen Oxides	Hydro-Carbons
1	0-5000	0-1000	0-1000
2	5000-10000	1000-2000	1000-2000
3	10000-15000	2000-3000	2000-3000
4	15000-20000	3000-4000	3000-4000
5	20000-25000	4000-5000	4000-5000
6	25000-30000	5000-6000	5000-6000

(Figures are given in pounds per day per grid)

The social data were obtained from the special 1967 New Haven census. The unit of analysis is the Block Group. Block Groups consist of about

4 to 8 city blocks while 5 to 8 Block Groups constitute a census tract. The Block Groups are roughly equal in population, each having about 1200 to 1800 people, although a few predominately industrial Block Groups have virtually no population. These latter Block Groups have been omitted from the analysis, giving a total of 107 Block Groups.

Three socio-economic haracteristics employed in the study were:

(1) Median family income (1966)

(2) Per cent of families receiving relief incomes

(3) Socio-economic status (SES)

The first two are self-explanatory and were obtained directly from the 1967 census data. The third is a construct which was developed by the Census Bureau.[8] The construct is based on five variables derived from correlational and factor analyses of the census data:

(1) Median family income

(2) Per cent of the population over 21 years of age with less than 12th grade school attendance

(3) Per cent of employed males in unskilled, semi-skilled and service occupations

(4) Overcrowding index: the percentage of occupied housing units having 1.01 or more persons per room

(5) Normal family life index: percentage of children under 18 years of age who live with both parents

On the basis of these five variables, an SES Score was obtained for each Block Group. The Block Group scores were ranked from low to high and divided into 4 quartiles or 4 SES groups: lower, lower-middle, upper-middle, and upper SES.

Each Block Group was assigned a pollution level from 1 to 6 for each of the 3 pollutants (carbon monoxide, nitrogen oxides and hydrocarbons). Since many of the Block Groups did not neatly lie within one contour level, they were assigned to the level which covered the greatest amount of area in that particular Block Group.

For the chi-square analysis the 6 levels of emissions were recombined into 3 categories:

LOW	Level 1 + Level 2
MEDIUM	Level 3 + Level 4
HIGH	Level 5 + Level 6

Also the median family incomes for the 107 Block Groups were placed in rank order and divided at natural breaks into approximately equal thirds:

LOW	$0-5400	N= 40
MEDIUM	$5401-7045	N= 37
HIGH	$7046 and up	N= 30

The percentages of Families receiving relief incomes were also ranked from high to low and divided into roughly equal numbers of Block Groups:

0% - 2%	N= 35
3% - 6%	N= 38
7% - 37%	N= 34

Discussion

As can be seen from the following tables there are significant differences between the social class levels and the levels of pollution exposure. In general, Block Groups with low median family income, high proportions of relief families and with lower socio-economic status scores are more likely to be exposed to medium and high pollution levels than are those Block Groups at the opposite end of the social class scale. All of

C A R B O N M O N O X I D E

Median Family Income	POLLUTION LEVELS LOW	MEDIUM	HIGH
$7046 and up	25	4	1
$5401 - 7045	25	10	2
$0-5400	23	12	11

X^2=23.23, 4df, p<.001 Total=107 Block Group

Per cent of Relief Income Families	POLLUTION LEVELS LOW	MEDIUM	HIGH
7 to 37%	7	23	4
3 to 6%	15	19	4
0 to 2%	19	16	0

X^2=12.92, 4df, .02>p>.01 Total-107 Block Group

Socio-economic Status	POLLUTION LEVELS LOW	MEDIUM	HIGH
Upper	17	7	1
Upper-middle	14	8	2
Lower-middle	8	20	2
Lower	4	21	3

X^2=20.79, 6df, .01>p>.001 Total=107 Block Group

H Y D R O C A R B O N S

Median Family Income	POLLUTION LEVELS LOW	MEDIUM	HIGH
$7046 and up	25	5	0
$5401 - 7045	18	17	2
$0 - 5400	5	31	4

X^2=37.30, 4 df, p<.001 Total=107 Block Group

Per Cent of Relief Income Families	POLLUTION LEVELS LOW	MEDIUM	HIGH
7 to 37%	8	23	3
3 to 6%	14	21	3
0 to 2%	23	12	0

X^2=13.53, 4df, p<.01 Total=107 Block Group

Socio-economic Status	POLLUTION LEVELS LOW	MEDIUM	HIGH	
Upper	19	5	1	25
Upper-middle	13	10	1	24
Lower-middle	10	18	2	30
Lower	4	22	2	28

X^2=23.17, 6df, p<.001 Total=107 Block Groups

N I T R O G E N O X I D E S

Median Family Income	POLLUTION LEVELS LOW	MEDIUM	HIGH
$7046 and up	25	4	1
$5401 - 7045	25	10	2
$0 - 5400	11	18	11

X^2=26.10, 4df, p<.001 Total=107 Block Group

Per Cent of Relief Income Families	POLLUTION LEVELS LOW	MEDIUM	HIGH
7 to 37%	13	14	7
3 to 6%	27	9	2
0 to 2%	23	8	4

X^2=10.19, 4df, .05>p>.02 Total=107 Block Group

Socio-economics Status	POLLUTION LEVELS LOW	MEDIUM	HIGH
Upper	17	6	2
Upper-middle	15	6	3
Lower-middle	16	8	6
Lower	13	12	3

X^2=5.67, 6df, .50>p>.30 Total=107 Block Groups

these differences are statistically significant except nitrogen oxides and socio-economic status; and even here the distributions are in the predicted direction, with a large proportion of lower-middle and lower SES blocks in the medium and high pollution levels.

We also made an attempt to determine whether there is a relationship between race and the levels of air pollution. Block Data were employed, giving for each city block the number of whites and Negroes. Each block was assigned to one of the six pollution levels for each of the three pollutants. The method of assignment in those cases where the blocks were on the border between two levels, was to determine within which contour level the areal centroid of the block lay, and assign the block to that level.

The percentages of whites and Negroes residing within each of the six levels was computed. The percentage of people in each level for each race was also computed and the results are shown graphically in the following diagram.

Interestingly, for two of the pollutants higher proportions of white city residents than of black are exposed to the three highest levels. For carbon monoxide, 32.8 percent of whites and only 18.6 percent of the blacks are exposed to the three highest levels. For hydrocarbons, 31 percent of whites and only 15.7 percent of blacks are exposed to the three levels. For nitrogen oxides, 36.2 percent of the blacks and only 25.0 percent of whites are exposed to the highest three levels. These data provide some suggestion that class rather than race may be the more salient factor in

WHITES

1	2.	3	4	5	6
16.0	24.5	26.8	22.0	7.2	2.9

NEGROES

1	2	3	4	5	
20.8	15.4	4-5.2	12.8	4.7	1.1

LOW — CARBON MONOXIDE — HIGH

WHITES

1	2.	3	4	5	6
17.4	24.5	24.8	21.8	6.7	2.5

NEGROES

1	2	3	4	5	
12.4	12.1	45.7	10.6	4.1	0.9

LOW — HYDROCARBONS — HIGH 15

WHITES

1	2	3	4	5	6
31.1	28.5	15.5	11.8	10.9	2.3

NEGROES

1	2.	3	4	5	6
15.4	27.0	21.4	10.1	6.2	10.9

determining risk to the health hazards of air pollution.

Again let me emphasize that this effort explores an idea with the available data. Still there are interesting trends which suggest that environmental deterioration is of equal, if not greater, importance to the urban poor as it is to the peregrine falcon. As Goldsmith notes:

"The average adult male requires about 30 pounds of air each day compared with less than 3 pounds of food and about 4 1/2 pounds of water. Compared with the other necessities of life, obligatory continous consumption is a unique property of air. The insensible, intimate interpenetration of air which courses in and out from the lungs gives to air pollution its essential importance. It has been estimated that a man can live for 5 weeks without food, for 5 days without water, but for only 5 minutes without air. Air is essential to the sense of sight, smell, and hearing and its pollution assaults the first two of these."[9]

In addition to assaulting the sense of sight and smell the three common pollutants examined in this report have certain known health effects which are differentially borne by the urban poor. DeLouise provides a useful summary:

(1) Nitrogen Oxide (NO_2) is an irritant gas which produces its injury by reacting with the alkalines of lung tissues. In sufficient amounts this leads to edema of the lungs which can result in death. NO_2 is among the most insidious of gases. Since it fails to set up respiratory reflexes, a victim may breathe a fatal amount without significant discomfort. Hours after an acute exposure, the victim develops a dry cough, shortness of

breath and restlessness which can progress to frothy sputum tinged with blood, massive edema and death by "drowning" in body fluids.

(2) Carbon Monoxide (CO) is nonirritating and nontoxic to tissues producing its damage by combining preferentially with hemoglobin of the blood, thus excluding oxygen from the tissues and leading to asphyxiation of the cells, especially nerve cells. It is an insidious pollutant due to poor warning characteristics (due to absence of ordor, and mildness of symptoms preceding very dangerous blook levels, especially at high concentrations). Symptoms are dizziness, headache, discomfort, weakness, heart palpitation, staggering, confusion of mind, nausea, vomiting, unconsciousness, convulsion, weak pulse, and slow respiration.

(3) Hydrocarbons - Hydrocarbons are a group of substances which can react photochemically at very low concentrations to produce irritating and toxid substances. One hydrocarbon, carcinogen, is known to cause certain types of cancer under laboratory conditions.[10]

Each of these pollutants, when ingested at certain modest levels over continuing periods, is likely to be an important influence upon one's ability to persist in the struggle for improvement of social position. This would seem especially so when such conditions tend to reinforce existing social structural constraints and intergenerational cultural values. Not only do the poor pay more, they bear a greater share of the social costs involved in social and technological change. While the upper class urban or suburban commuter faces peaks of high pollution exposure his body has

much longer troughs of lower exposure levels and some ability to discharge the irritants. The same is not true for the urban poor who face unremitting, continuing exposures which like nutritional deficiencies seem one mechanism by which class inequalities are maintained.

This is especially so when we consider that air pollution is but one of a whole series of assaults upon the senses which are differentially born by the poor. An interesting example of this is provided by the recent National Academy of Science study of the Kennedy Airport, Jamaica Bay Extension.[11] One member of the investigation team told me there are two ways for measuring the high noise contours of jet approach and take-off. One way is to station sensitive measuring instruments about and within the perimeters of prevailing flight patterns. The other way is to have a social map -- and to note where there are the highest concentrations of black and/or poor populations, and it is in these sections where there will be the highest -- indeed -- almost intolerable noise levels.

According to the Academy report, there are more than 700,000 people in the environs of Kennedy who persist under a noise-exposure forecast (NEF) index of greater than 30. It is generally agreed that residential areas should be exposed to considerably less than NEF 30. The result is that these people suffer from agravated irritability, interruption and loss of sleep, loss of significant time periods in which normal conversation can be carried on, reduction of hearing acuity and possibly other physiological effects. A 1969 sample study of persons living within this zone

found only 7 percent who reported no annoyance.[12] Within this zone some 275,000 school children are served under the modern phenomenon of "jet-pause teaching." That is, for example, at Arverne every two minutes a jet over-flight would provide a "20-second interval of noise. . . sufficient to eliminate all except shouted communications on the school site and in typical classrooms with windows closed."[13] In actual time lost a full day of the school week is consumed in this fashion -- which does not include the induced fatigue or irritability caused by the noise.

Interestingly, the bulk of the population in these high noise contours are residents of low income public housing. Further, the planners have either completed or have in construction and planning more such units with the projected capacity of another 185,000 people. Moreover, few of these projected units have even minimal sound damping construction. One high rise project is so situated that F.A.A. officials describe its expected noise levels "would be equivalent to a diesel freight train travelling at 50 miles an hour and passing at a distance of 100 feet every 45 seconds."[14] So much for the sound of the friendly skies. Certainly such conditions of existence would seem to perpetuate from generation to generation life in the underclass.

Conclusions

Etzioni, as so many social scientists, assumes that because his solutions seem directly tied to human welfare they must, therefore, be more beneficial for human welfare. Yet is it really an improvement to have children no longer die from infections carried by rats, but to die from respiratory diseases? Is it really anything more than liberal myopia to

improve schools for pupils who have been rendered physiologically incapable to benefit because of poor nutrition, ingestion of pollutants and the distraction of noise? Though we should like our problems to follow the neat lines of academic disciplines, they have their own ecology which compels us to solve all problems at the same time if any are to be solved at all.

Though many promoters of the moment have attempted to separate problems of the environment from problems of poverty and peace, the reality is something quite different. Man is a creature of this earth and the more impoverished he is the more he is bound into its strictures. In the urban situation this is even more so -- because the city as the prime creation of man is completely dependent upon the hinterland for its survival -- from the hinterland comes air, water, food and energy -- and to it is returned the accumulated wastes. None of this is inexhaustible, nor is access equally distributed. We should recall that our primary means of "solving" poverty has not been redistribution of wealth but expansion of the economy through ever-expanding production. As recent events have indicated -- it is no longer an American century -- resources are scarce and highly competed for. It is -- as the peregrine falcon would remind us -- a finite world, and certain biological propensities bind even the uniquely symbol-using species.

As I have noted elsewhere:

". . . it should be apparent that the struggle with Social Darwinism, which minimized the biological input into the social sciences, never did

succeed in overcoming the rugged capitalists. All it managed to do was trivialize the social sciences by removing the one model which could identify the genuine horrors of private and state capitalism. The virtue of reconsidering biological elements is that it forces us to consider life rather than mechanics and to gain humility rather than arrogance in examining the relations among men and between men and their environment. To be a member of a community of life sharing a highly interdependent kinship with other creatures is to be something quite different than a lord of the earth whose manifest destiny is to convert all into his own image."[15]

Footnotes:

1. Amitai Etzioni, "The Wrong Top Priority" Science v. 168 (22 May 1970) p. 921

2. Joseph Schumpeter, Social Classes - Imperialism Heinz Norden trans (New York: Meridian Books, 1960) p. 83

3. Melvin L. Kohn, Class and Conformity - A Study in Values (Homewood, Illinois: The Dorsey Press, 1969) p. 3

4. Joaquin Cravioto, "Nutritional Deficiencies and Mental Performance in Childhood" in David Glass ed., Environmental Influences (New York: The Rockefeller University Press, 1968) pp. 48-57

5. Heinz F. Eichenwald and Peggy Crooke Fry, "Nutrition and Learning", Science v. 163 (14 February, 1969) p. 648

6. Lester B. Lave and Eugene P. Seskin, "Air Pollution and Human Health," Science v. 169 (21 August, 1970) p. 728

7. Edward R. De Louise, Air Pollution in New Haven, Connecticut - Status Report on the Problem and Program (New Haven Health Department, June 1968).

8. U. S. Bureau of the Census, Census Use Study Report Number Twelve. Health Information Systems II, 1971.

9. J. R. Goldsmith, "Effects of Air Pollution on Human Health" in Arthur C. Stern ed., Air Pollution Volume I (New York: Academic Press, 1968) p. 547

10. Also see Goldsmith ibid and Herbert E. Stokinger and David L. Coffin "Biologic Effects of Air Pollution" in Arthur C. Stern ed., Air Pollution.Volume I (New York: Academic Press, 1968) pp. 445-546

11. Jamaica Bay Environmental Study Group, Jamaica Bay and Kennedy Airport (Washington, D. C. : National Academy of Science, 1971)

12. Tracor Document No. T-70-AU-7454-U, "Community Reactions to Airport Noise," September 4, 1970.

13. Op cit. 11 p. 96

14. Op cit reported p. 100

15. William R. Burch, Jr., Daydreams and Nightmares - A Sociological Essay on the American Environment (New York : Harper & Row, 1971) p. 16.